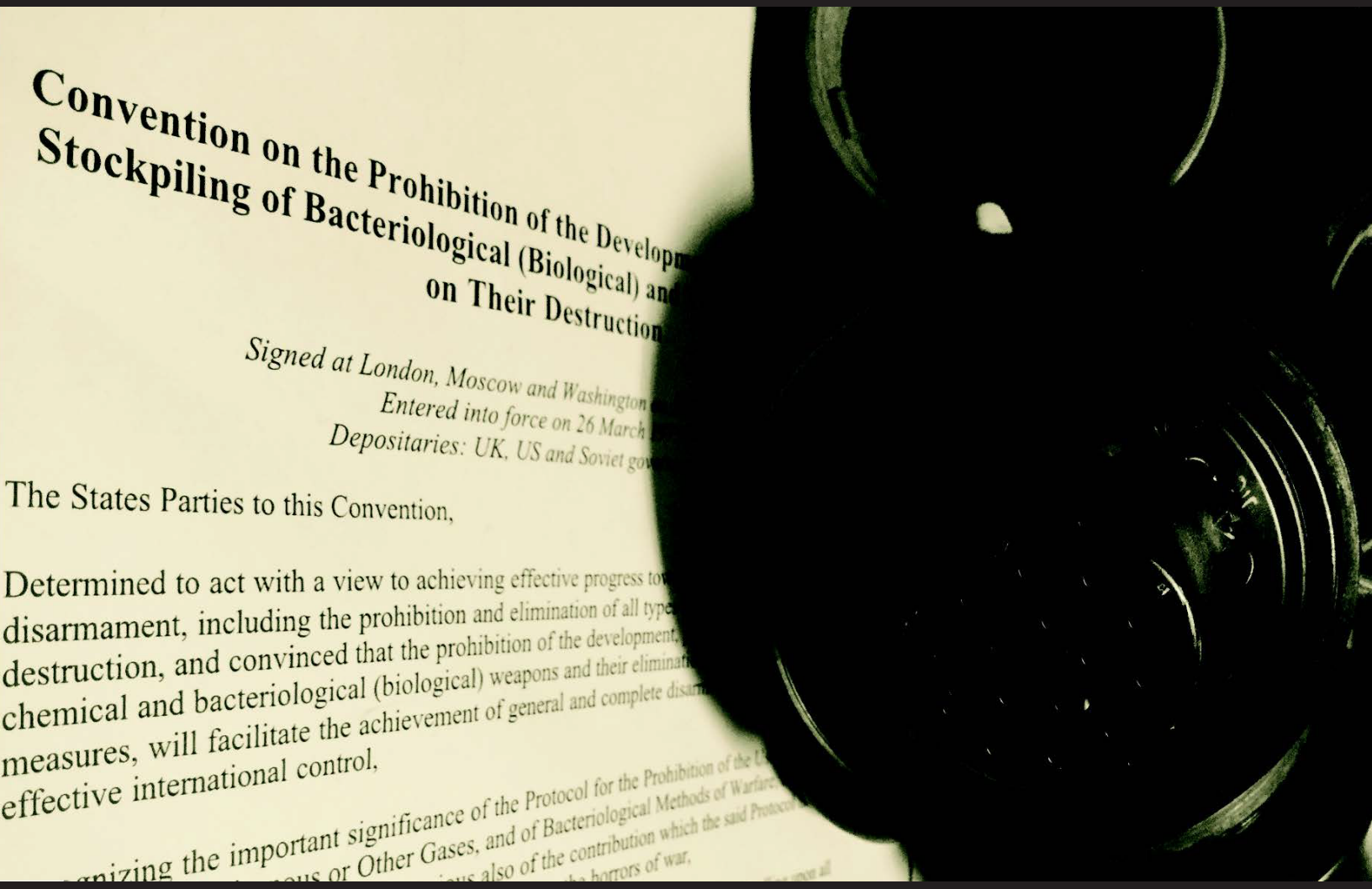

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Compliance Revisited: An Incremental Approach to Compliance in the Biological and Toxin Weapons Convention

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Executive summary

Since the collapse of negotiations around a protocol to the 1972 Biological and Toxin Weapons Convention (BWC) in 2001, states parties have begun to discuss several novel issues linked to the broader implementation of the BWC as part of a series of intersessional meetings. While initially fruitful, this approach has generated diminishing returns in the last five years. Moreover, in addressing these broader issues of implementation, biological disarmament diplomacy has largely neglected the thorny issue of compliance.

Compliance with the BWC is more than a simple binary choice to sign a commitment not to develop or produce biological weapons. It requires the adherence to all the obligations, both negative and positive, undertaken by BWC states parties in signing and ratifying the convention. In the BWC context, this is complicated by the ambiguity surrounding certain obligations, changes in science and security, and the limited resource capacity of some states to fulfill their obligations. Under such circumstances, without episodically revisiting compliance, there remains the risk that BWC will become ever more fragmented, outmoded and poorly implemented.

Although many states insist strengthening the convention can only be achieved through a multilaterally negotiated, legally binding verification protocol, this is not politically feasible for the foreseeable future. Nor is this necessarily true; an incremental approach to strengthening the convention could be pursued, dealing with mutually reinforcing components of the regime in a balanced manner and laying the foundations for future work, if and when it becomes politically expedient to proceed.

This Occasional Paper proposes a number of activities that could be pursued as part of an incremental approach to revisiting compliance with the BWC. These activities are summarized below.

Revisit the relevant science and technology	The science and technology of relevance to detecting, but also developing and disguising biological weaponeering has changed considerably since the work of verification experts in the early 1990s. As such, there is a need to re-examine the science and technology of potential relevance to compliance under the BWC as part of a wider process of reviewing science and technology of relevance to the convention.

Enhance the collection and analysis of compliance indicators	Compliance begins at home, and one simple step toward monitoring compliance would be the submission of information on the activities undertaken by states parties to be compliant with the BWC. To some extent, this is already achieved with confidence-building measures (CBMs), but there is a need for quantitative and qualitative improvements in the data collected. There is also a need to better use this information through assessments of national implementation using tools, such as peer review.
Develop the consultative mechanism	Article V of the BWC obliges states parties "to consult one another and to cooperate in solving any problems which may arise." This remains an important yet neglected tool for dealing with a potentially wide range of issues under the BWC, ranging from high-stakes accusations of non-compliance to comparatively minor disagreements and ambiguities. As such, states parties could usefully develop the BWC consultative mechanism through agreement around a flexible set of procedures and practices that could be applied in order to resolve any problems which may arise.
Building the provision of assistance in the event of a violation of the BWC	States parties have made some progress in developing understandings around the provision of assistance in the event of a violation of the Convention as required under Article VII. However a number of substantive and procedural questions remain which will be important to address in advance of any event in order to minimize the degree of "muddling through" in a time of acute crisis.
Explore voluntary visits	"Visits" are recognized as serving a number of functions, including a cooperative function, and would be an important part of any effort to strengthen the biological weapons regime. As such, another step could be to further explore voluntary visits with a view to building a greater appreciation of what can realistically be expected of them and to reach out to stakeholders with a view to exchanging ideas on better practices and drawing out lessons learned in biological disarmament.
Enhance the United Nations Secretary-General's Mechanism (UNSGM)	Allegations of association with biological weapons can be a powerful tool with which to "vilify enemies" and, in the event of any allegations of BW use, there is likely to be considerable misinformation, disinformation, and propaganda circulated through traditional and new media. This makes independent assessments of allegations by a neutral body, such as the United Nations Secretary-General's Mechanism (UNSGM), increasingly important. However, the biological component of UNSGM remains underdeveloped and, accordingly, there is a need

	enhance the UNSGM to ensure any biological investigation is able to withstand considerable international scrutiny.
Remedy the institutional deficit	The BWC's Implementation Support Unit (ISU) consists of three people (with some additional support through the European Union). Any initiatives intended to expand BWC-related compliance activities—or indeed of any other activities of the BWC— will require a commensurate expansion of the ISU.

The paper argues that, while the norm against biological weapons embodied in the BWC continues to appear robust, norms as social constructs are neither permeant nor inviolable. Rather they remain subject to change, particularly in conditions where science and technology are evolving and the associated regimes are weak. As such, without revisiting compliance and tending the convention, there is a risk that the regime will be left to fester and fragment, in time potentially diminishing the norm against biological weapons. The 2017 Meeting of States Parties to the Convention held later this year presents an opportunity to revisit compliance with a view to bolstering the international prohibition on a category of weapons deemed "repugnant to the conscience of mankind" and states should seize this opportunity.

Compliance Revisited:
An Incremental Approach to Compliance in the Biological and Toxin Weapons Convention

James Revill

In 2001, following the acrimonious collapse of nearly a decade of work toward a legally binding protocol to strengthen the 1972 Biological and Toxin Weapons Convention (BWC), states parties embarked upon a series of annual discussions between quinquennial review conferences. In part because expectations for these intersessional meetings were so low, the first two sets of annual meetings proved unexpectedly fruitful in terms of process and substance; however, over the course of the third intersessional process, they appear to have moved beyond their best-before-date and turned stale.[1]

For this reason, over the last few years, a number of states parties have sought alternative approaches to strengthen the convention, including a small number of proposals and initiatives linked to the thorny topic of compliance: the observation of the obligations, both negative and positive, undertaken by all BWC states parties. Although discussion on compliance within the BWC has been stymied by political sensitivities and is unlikely to manifest on the agenda soon, revisiting what is meant by compliance in the twenty-first century will be important if the BWC is to remain relevant in a rapidly changing world.

It is against this background that this Occasional Paper seeks to revisit the concept of compliance in the BWC. It begins by outlining the convention's recent history, and then proceeds to explore compliance, drawing on the broader work of legal scholars Abram Chayes and Antonia Chayes to outline the complexity of compliance and the difficulties generated by ambiguity, capacity, and the temporal nature of disarmament agreements. It then examines verification as a means of evaluating compliance, building on the work of Douglas MacEachin, former Deputy Director for Intelligence, US Central Intelligence Agency, and Julian Perry Robinson, co-founder of the Harvard Sussex Program, to outline how the concept of a regime of declarations, visits, and inspections could potentially be applied in the future to detect noncompliance, but also dissuade cheaters and remove the camouflage provided by "dual-use" biotechnology.

The article asserts that revisiting the protocol is not feasible in the foreseeable future. However, an incremental approach to strengthening the convention could be pursued, dealing with mutually reinforcing components of the regime in a balanced manner. Such a process could operationalize several components of a BWC compliance architecture and lay the foundations for future work, if and when it becomes politically expedient to proceed. The final section outlines several modest, practical steps that could be considered by states parties in this regard; either by working inside the

[1] Richard Lennane, "Building on Success: The Future of the Intersessional Process," in Piers Millet, ed., *Improving Implementation of the Biological Weapons Convention* (Geneva: United Nations Institute for Disarmament Research, 2011), pp. 259–66.

convention where possible, or, in some cases working outside the convention to explore concepts before bringing them back in from the outside.

The Evolution of the BWC

Difficulties with the detection of noncompliance were recognized from the outset of discussions around biological disarmament in the mid-to-late 1960s; notwithstanding such difficulties, a proposal for a "quick and automatic" investigation of allegations of biological weapons (BW) use was put forward by the UK delegation during the negotiation of the BWC.[2] At the time, however, neither the United States nor the Soviet Union had sufficient appetite for such a proposal and it was omitted in the convention's final text. Although provision for consultations (Article V) and complaints (Article VI) were included, the BWC entered into force in 1972 devoid of any means of evaluating the compliance of states parties with their obligations.

Accordingly, there have been several efforts to develop "functional substitutes" for evaluating compliance, although not until the 1990s did states enter into serious discussion about remedying the "verification deficit."[3] Such discussion was achieved firstly through VEREX, an "ad hoc group of governmental experts" established in 1991 to "identify and examine potential verification measures from a scientific and technical standpoint."[4] In four sessions, twenty-one potential verification measures were identified and evaluated as "useful to varying degrees in enhancing confidence, through increased transparency, that States Parties were fulfilling their obligations under the BWC."[5]

The conclusions of VEREX were followed by a process of political negotiations in the form of the ad hoc group (AHG), which first met in early 1995. The AHG was mandated to "consider appropriate measures, including possible verification measures, and draft proposals to strengthen the Convention, to be included, as appropriate, in a legally binding instrument."[6] Its work focused on a balanced package of activities in four areas: "definitions of terms and objective criteria," "enhanced confidence building and transparency measures," a "system of measures to promote compliance with the Convention," and "specific measures designed to ensure effective and full implementation of Article X," a reference to the convention's provisions on scientific and technological exchanges for peaceful purposes.[7]

Although this AHG process initially made progress, by the end of the 1990s it became stymied by political division, and it ultimately collapsed in 2001. Ostensibly, this was at the hands of the United States, which argued the treaty was not effectively verifiable:

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[2] Eighteen-Nation Committee on Disarmament, "Final verbatim record of the Conference of the Eighteen-Nation Committee on Disarmament [Meeting 418]," ENDC/P.418, p. 10; see also John R. Walker, *Britain and Disarmament* (Farnham: Ashgate, 2012), p. 76.
[3] Nicholas Sims, *The Evolution of Biological Disarmament*, SIPRI Chemical & Biological Warfare Studies no.19 (Oxford: Oxford University Press, 2001), p. 23.
[4] BWC, "Final Declaration of the Third Review Conference," BWC/CONF.III/23, September 27, 1991, p. 16.
[5] BWC, "Final Declaration of the Special Conference," BWC/SPCONF/1 Part II, April 15, 1994, p. 10.
[6] Ibid.
[7] Ibid.

"We will not be protected by a 'Maginot treaty' approach to the [biological weapon] threat."[8] However, the US position allowed several other states that had previously objected to aspects of the protocol to hide behind US policy.[9]

This left a decade of work in stasis, or to quote Carleton University's Jeremy Littlewood, either "like Sleeping Beauty awaiting the kiss that would bring it back to life" or, depending on one's perspective, "a zombie rising from the grave" that "if unleashed … would inexorably drag States Parties back into a black hole of arguments."[10]

In an effort to salvage something from the collapse of the negotiations, AHG Chair Tibor Tóth offered states parties a "rescue package" of intersessional activities to "discuss, and promote common understanding and effective action" on a variety of issues, such as national legislation, biosecurity, and disease detection.[11] This mandate represented a considerable shift away from the AHG's pursuit of formal negotiations on a legal agreement and toward discussion on a number of new and novel issues linked to the broader implementation of the BWC.

Although initially met with skepticism, the first intersessional process between 2003 and 2005 proved an unexpected success, to the extent that, at the Sixth Review Conference in 2006, states parties agreed to undertake a similar exercise. By the time the Seventh Review Conference convened in 2011, a decade of discussion had demonstrated a number of procedural and substantive benefits from this mode of work. In terms of procedure, the intersessional processes served, inter alia: to improve relations between states following the acrimonious collapse of the protocol negotiations; to encourage open discussion devoid of the strictures of a negotiating climate; and to more closely integrate the scientific, academic, and nongovernmental communities in discussions around aspects of biological disarmament in Geneva. In terms of substance, the intersessional process enabled states parties to build a better understanding of new and novel areas, such as biosecurity, biorisk management, and codes of conduct for scientists. And it did so at a time of heightened concerns over bioterrorism, when such concepts were becoming increasingly important in contributing to the prevention of the use of biological weapons (BW) by non-state actors.[12]

At the Seventh Review Conference in 2011, states parties agreed to continue intersessional meetings with only modest changes. Specifically, they agreed to focus their efforts on three standing agenda items (cooperation and assistance, science and technology, and national implementation) with two additional agenda items,

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[8] John R. Bolton, Statement to the Fifth Review Conference of the Biological Weapons Convention, Geneva, Switzerland, November 19, 2001, <https://2001-2009.state.gov/t/us/rm/janjuly/6231.htm>.
[9] Richard Lennane, "Blood, Toil, Tears and Sweat: The Biological and Toxin Weapons Convention since 2001," *Disarmament Forum*, no. 3 (2006), p. 9.
[10] Jeremy Littlewood, "The Verification Debate in the Biological and Toxin Weapons Convention in 2011," *Disarmament Forum*, no. 3 (2011), p. 21.
[11] Nicholas Sims, "Biological Disarmament Diplomacy in the Doldrums; Reflections after the BWC Fifth Review Conference," *Disarmament Diplomacy* 70 (2003), pp. 11–18.
[12] James Revill and Malcolm Dando, "The Rise of Biosecurity in International Arms Control," in Brian Rappert and Chandré Gould, eds., *Biosecurity: Origins, Transformations and Practices*, New Security Challenges, (Basingstoke & New York: Palgrave Macmillan, 2009), pp. 41–59.

confidence-building measures (CBMs) and Article VII (providing assistance or support to states exposed to BW danger), scheduled for attention over the intersessional process. As such, this process perhaps satisfied the "prevailing needs and opportunities" upon which disarmament is contingent.[13] However, such prevailing needs and opportunities are not fixed, but are rather context-dependent, and, after nearly a decade-and-a-half of intersessional meetings, several states have begun to question whether the intersessional process remains the most suitable vehicle for continuing progress in the BWC, or whether it has begun to go stale.

Indeed, despite the third intersessional process between 2012 and 2015 allowing fruitful discussion in certain areas (particularly the provision of assistance in the event of a violation of the convention), the limited time for in-depth discussion and the continued lack of scope to make recommendations has yielded diminishing returns in terms of substantive agreements, yet alone effective action.[14] Put bluntly by US Ambassador Robert Wood at the Preparatory Committee for the Eighth Review Conference, held in April 2016, "the last intersessional process simply did not work, and repeating it should not be considered a reasonable option by any delegation."[15]

To overcome the diminishing returns of the intersessional process, a number of states sought a more action-orientated program of work from the Eighth Review Conference in November 2016, with a number of proposals seeking to, inter alia, empower intersessional meetings to make more substantive decisions, improve the process of reviewing science and technology, enhance provision of assistance in the event of a violation of the convention, improve the consultative mechanism under Article V, and attend to the issue of compliance.

However, some states—particularly Iran—viewed these ideas as a step in the wrong direction, and the Eighth Review Conference ended as "a great disappointment."[16] With the exception of progress in the additional understanding linked to Article VII, the conference largely failed to update the additional understandings agreed upon at the Seventh Review Conference in 2011.[17] Moreover, it failed to agree on a program of

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[13] Pál Dunay, "Arms Control in the Post-Cold War World," in Pál Dunay, Márton Krasznai, Hartwig Spitzer, Rafael Wiemker, and William Wynne, eds., *Open Skies—A Cooperative Approach to Military Transparency and Confidence Building* (Geneva: UNIDIR, 2004), p. 6.

[14] Lennane, "Building on Success."

[15] Statement by Robert Wood, US Ambassador, to the Preparatory Committee Meeting for the Eighth Biological and Toxin Weapons Convention Review Conference Geneva, April 26, 2016, <https://geneva.usmission.gov/2016/04/27/ambassador-robert-woods-statement-at-the-bwc-preparatory-committee-meeting/>.

[16] Jean-Pascal Zanders quoted in Jez Littlewood, "The Art of Looking for Trouble," *CBRNe World* 54 (December 2016), <https://carleton.ca/npsia/wp-content/uploads/Littlewood-2016-BWC-CBRNE-World-The-art-of-looking-for-trouble.pdf>; see also Catherine Rhodes, "Make the Bioweapons Treaty Work," *Bulletin of the Atomic Scientists* 2017 <http://thebulletin.org/make-bioweapons-treaty-work10755>.

[17] Review conferences seek to reach "additional understandings," or "additional agreements," to supplement the BWC. The BWC Implementation Support Unit defines additional agreement as one which "interprets, defines or elaborates the meaning or scope of a provision of the convention; or (b) provides instructions, guidelines or recommendations on how a provision should be implemented." See "Additional agreements reached by previous Review Conferences relating to each article of the Convention," BWC/CONF.VII/INF.5, September 28, 2011, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G11/638/47/PDF/G1163847.pdf?OpenElement>.

substantive work between the Eighth and Ninth Review Conferences, and instead "decided that States Parties will hold annual meetings" mandated to "make progress on issues of substance and process for the period before the next Review Conference, with a view to reaching consensus on an intersessional process."[18]

The outcome is that the last fifteen years have been marked by a conspicuous absence of any serious discussion around the thorny issue of compliance, tension around which continues to simmer beneath the surface. Despite some states' efforts to broach the topic—either by proposing a conceptual discussion or exploring innovative approaches that could contribute to building confidence in compliance, such as voluntary peer-review-type activities —the topic remains sensitive to many states.[19] Yet sensitive or not, without episodically revisiting the concept of compliance (with all the convention's provisions), there remains the risk that BWC compliance will become ever more fragmented and outmoded as the scientific and security context continues to evolve. This has wider implications for the norm against biological warfare that is embodied in the BWC. Although it has been correctly argued that the norm is currently "widely recognized and seldom contested," norms as social constructs are not sacrosanct and remain vulnerable to change, particularly in conditions of changing science and weakened regimes. [20]

The BWC is an "artefact of political choice" and its formulation and conclusion have been "designed to ensure that the final result will represent, to some degree, an accommodation of the interests of the negotiating states."[21] Making the decision to join the convention is therefore not something taken lightly; it entails a commitment to "limit the absolute sovereignty of a state party to defend itself."[22] Moreover, it requires considerable time and political will to secure the interagency commitments necessary to sign and ratify an international agreement.[23]

Complying with the convention is therefore more than a binary choice to sign a commitment not to develop or produce BW.[24] As critically important as this Article I undertaking is, compliance can be understood more broadly as the observation of all

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[18] BWC, "Final Document of the Eighth Review Conference," BWC/CONF.VIII/4, January 11, 2017.
[19] On the conceptual discussion of compliance, see, inter alia, Australia, Canada, Japan, New Zealand, and Switzerland, "We Need to Talk about Compliance," BWC/MSP/2012/WP.11, December 12, 2012, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G12/639/38/PDF/G1263938.pdf?OpenElement>.
[20] Lennane, Richard. "Divide and Delegate: The Future of the BWC, 2016," *International Law and Policy Institute (ILPI)* BWC Briefing paper number 1 <http://nwp.ilpi.org/wp-content/uploads/2016/11/01-Divide-and-delegate-gold.pdf>.
[21] Abram Chayes and Antonia Handler Chayes, "On Compliance," *International Organization* 47 (1993), pp. 175–205.
[22] Jean Pascal Zanders, "Challenges to Disarmament Regimes: The Case of the Biological and Toxin Weapons Convention," *Global Society* 15 (2001), p. 364.
[23] Treasa Dunworth, Robert J. Mathews, and Timothy Mc Cormack, "National Implementation of the Biological Weapons Convention," *Journal of Conflict and Security Law* 11 (Spring 2006), pp. 93–118.
[24] Antonia Handler Chayes, and Abram Chayes, "From Law Enforcement to Dispute Settlement: A New Approach to Arms Control Verification and Compliance," *International Security* 14 (April 1990), pp. 147–64.

the obligations, both negative *and positive*, undertaken by BWC states parties.[25] Beyond the Article I obligations not "to develop, produce, stockpile or otherwise acquire or retain" BW, additional negative obligations include the Article III commitment not to "transfer to any recipient whatsoever … agents, toxins, weapons, equipment or means of delivery," as well as the Article X undertaking to implement the convention in a manner that "avoid[s] hampering the economic or technological development of States … or international cooperation in the field of peaceful bacteriological (biological) activities."[26]

In contrast, the term *positive obligations* refer to actions that states parties have agreed to take. Under Article IV, for example, states are required to undertake "any necessary measures to prohibit and prevent" the development of BW within their territory. Article VII requires states parties to assist others that have "been exposed to a danger as a result of a violation" of the BWC and, based on widely accepted interpretations of Article X, to do all of the above in a way that encourages the peaceful uses of biological science and technology.

Clarity of obligations

As with other international agreements (indeed, perhaps more so because of the succinct nature of the BWC text and its somewhat hasty negotiation) many obligations under the BWC are ambiguous.[27] The additional understandings reached at successive review conferences, along with more than fifteen years of intersessional discussions, have helped flesh out some treaty obligations. Moreover, there likely remains much underexploited "substance hidden under [the] mountain of paper" produced in and for these discussions since 2002.[28] Nevertheless, elaborate, concrete, common understandings have been few and far between over the course of the intersessional processes, with some aspects of the biological disarmament discourse suggesting divergence, rather than convergence, in the shared expectations of BWC states parties.[29]

Article I prohibits any use of biological agents or toxins that are not intended for "prophylactic, protective or other peaceful purposes."[30] This focus on intent—rather than a list-based approach—instills the BWC (as well as the 1997 Chemical Weapons Convention or CWC) with a timeless quality, as new developments in biology that could otherwise be excluded from any agreed-upon list would be covered. Nevertheless, it serves as a source of ambiguity, and abstract concepts such as "prophylactic, protective or other peaceful purposes" remain open to different interpretations.

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[25] Richard Lennane, "Verification for the BTWC: If Not the Protocol, Then What?" *Disarmament Forum*, no. 1 (2011), pp. 39-50.
[26] The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (BWC), March 26, 1975, Articles I, III, and X.
[27] Sims, *The Evolution of Biological Disarmament*, p. 4.
[28] Jeremy Littlewood, "Substance Hidden under a Mountain of Paper: The BWC Experts' Meeting in 2003," *Disarmament Diplomacy* no. 73 (2003), pp. 63–66.
[29] James Revill, "Deconstructing the BWC Seventh Review Conference, Workshop Summary," University of Sussex, March 8, 2012,
[30] BWC, Article I(1).

For example, does Article I cover the infestation of "munching insects" such as *Thrips palmi*;[31] are anti-material biological agents—genetically engineered microbes that can degrade a variety of substances—prohibited under the convention;[32] is it acceptable to conduct H5N1 influenza gain-of-function research?[33] These are questions around which there has been fundamental disagreement; certainly in relation to the latter, Iran has suggested that such research falls within a "gray zone," an argument supported by some civil-society actors, and which, given past additional understandings under Article I concerning the open-air release of pathogens, is not entirely unreasonable.[34] Yet there are also strong public-health grounds for undertaking such research, something recognized by several states, including the Netherlands, as important in order to help "understand the potential transmissibility of influenza strains, which can significantly benefit public health."[35]

With the growing salience of bioterrorism, Article IV, which deals with national implementation, has become increasingly important. Although Article IV's obligation to "prohibit" is fairly clear-cut, the simplicity of the article lends itself to some degree of ambiguity. Unlike the CWC, there are no matrices of key areas of national legislation, nor an unequivocal obligation to undertake penal legislation concerning such activity.[36] More ambiguous is the obligation that states parties take necessary measures to "prevent" BW domestically. Topics, such as codes of conduct and education and outreach, have received much attention at the intersessional meetings. Does this mean one can now assume these constitute necessary measures for "preventing" BW as required under Article IV? Certainly, some nongovernmental organizations have made a case for precisely that; yet the record of effective action undertaken would suggest they are not obligations, but supplementary "commitments" under Article IV.

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[31] See for example, Nicholas Sims, *The Evolution of Biological Disarmament*, SIPRI Chemical & Biological Warfare Studies no.19 (Oxford: Oxford University Press, 2001), p. 45.

[32] See "Non-Lethal Chemical Weapons," Federation of American Scientists, n.d., <https://fas.org/programs/bio/chemweapons/nonlethal.html>; see also United States of America, "Article I: Reinforcing the core prohibition of the Biological Weapons Convention," BWC/CONF.VIII/WP.14, October 25, 2016.

[33] Gain-of-function research aims to add capabilities to an existing virus in order to "enable the assessment of the pandemic potential of emerging infectious agents, and inform public health and preparedness efforts." See Francis S. Collins, "Statement on Funding Pause on Certain Types of Gain-of-Function Research," National Institutes of Health, October 17, 2014, <www.nih.gov/about-nih/who-we-are/nih-director/statements/statement-funding-pause-certain-types-gain-function-research>.

[34] Simon Wain-Hobson, "H5N1 Viral-Engineering Dangers Will Not Go Away," *Nature* 495 (March 2013), <www.nature.com/news/h5n1-viral-engineering-dangers-will-not-go-away-1.12677>. On past Additional Understandings, see BWC, "Final Declaration of the Fourth Review Conference," BWC/CONF. IV/9 Part II, December, 6, 1996, p. 16.

[35] The Netherlands, as cited in BWC, "Report the Meeting of Experts, Annex: Considerations, lessons, perspectives, recommendations, conclusions and proposals drawn from the presentations, statements, working papers and interventions on the topics under discussion at the Meeting," BWC/MSP/2012/MX/3, August 3, 2012, p. 22.

[36] Nicholas A. Sims, "The status of the Biological Weapons Convention (BWC) in relation to the prevention of bioterrorism," in Ian Bellany, ed., *Terrorism and Weapons of Mass Destruction: Responding to the Challenge* (London: Routledge, 2007), pp. 158–79.

Article X can also be seen as ambiguous, with disparate interpretations of both its focus and function. In terms of the focus, Article X encourages cooperation in the "prevention of disease," but also "other peaceful purposes," with the latter in particular open to broad interpretations.[37] Similarly, the function is ambiguously constructed and encourages both "regulatory and promotional" activities.[38] Several states, particularly from the Non-Aligned Movement, have vociferously emphasized the promotional aspect of Article X, not unreasonably so for states that face a significant disease burden but remain relatively untroubled by biological-weapons threats. In contrast, Western states are perhaps more focused on the obligation to avoid hindering international cooperation or technology transfers; and at least one Western state explicitly argued that Article X "does not impose any obligation mandating transfers between States Parties."[39]

The temporal dimension

The BWC does not operate in a vacuum, and the expectations of states parties are influenced by, inter alia, changes in the capacity and geography of the life sciences, evolving perceptions of security threats, and a shifting understanding of the relationship between disarmament and development.[40] In this regard, compliance is not an end-point where efforts can be considered completed, biological disarmament ticked off the to-do list, and attention moved elsewhere. Rather, "being compliant" is a state that requires episodic re-evaluation in order to be sustained.

This notion of temporality is not unique to the BWC; Chayes and Chayes have suggested disarmament agreements generally have a "temporal dimension."[41] However, it is particularly problematic in the BWC context, wherein the broader environment has changed considerably since 1972. Certainly, the relevant science and technology, while perhaps not quite as "revolutionary" as some commentators have suggested, continues to make incremental steps around the globe and in a number of interlinked areas, cumulatively enabling a greater understanding of the fundamental life processes and empowering scientists with an increasing capacity to manipulate biology.[42] Moreover, such capabilities are no longer restricted to a small number of laboratories in the Western world—if indeed they ever were—but are becoming increasingly distributed around an interconnected globe. These changes in the human geography of life-science research are coupled with growth in the range of disciplines—from engineering to computer science—that feed into advances in the life

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[37] BWC, "Final Declaration of the Third Review Conference," BWC/CONF.III/23, September 27, 1991, p. 14.
[38] Jeremy Littlewood, *The Biological Weapons Convention: A Failed Revolution* (Aldershot, UK: Ashgate, 2005), p. 163.
[39] US, "Proposals," BWC/CONF.V/COW/WP.17, Geneva, November 26, 2001, <www.unog.ch/bwcdocuments/2001-11-5RC/BWC_CONF.V_COW_WP.17.pdf>, p. 10.
[40] Sims, *The Evolution of Biological Disarmament* pp. 119–50.
[41] Chayes and Chayes, "On Compliance."
[42] Paul Nightingale and Paul Martin, "The Myth of the Biotech Revolution," *Trends in Biotechnology* 22 (November 2004), pp. 564–69. See also US National Research Council, *Life Sciences and Related Fields: Trends Relevant to the Biological Weapons Convention* (Washington, DC: National Academies Press, 2011).

sciences, and the emergence of activities that operate outside of the traditional laboratory settings, such as "DIY Bio."[43]

Concerns over changes in the capacity and (human) geography of the life sciences have shaped—and been shaped by—perceptions of the security challenge posed by BW. The confluence of events in 2001—specifically September 11, 2001, and the subsequent anthrax attacks—fueled the salience of bioterrorism in the international-security discourse.[44] It is perhaps for these reasons that the emphasis of the BWC regime has, for some states at least, expanded from a narrow focus on preventing the emergence and proliferation of major offensive state BW programs to the broader and more complex challenge of managing dual-use research across the globe.[45]

Finally, the agenda items for past intersessional meetings suggest that "increasing attention has been devoted to issues related to the international cooperation and development norm" embodied in Article X, where states pledge to "participate in the fullest possible exchange of equipment, materials and scientific and technological information" for "peaceful purposes" of biological agents.[46] There is little to suggest Article X was divisive during the negotiation of the BWC. However, broader influences, such as, inter alia, the creation in 1980 of the Australia Group—an informal forum of states agreeing to harmonize export controls to minimize chemical and BW proliferation—have fed into the growing salience of Article X in BW disarmament diplomacy.[47]

Capacity

The capacity of states to comply with the BWC remains an issue. Transposing the positive and negative obligations of the convention onto the national level is a significant task, particularly for states with limited resources and/or with rapidly expanding biotechnology sectors. Article IV, for example, can be seen as imposing a "heavy burden" upon some states, and one that they may not be able or willing to fulfill because of the resources required to do so.[48] Indeed, if CBMs are proving difficult for some states to complete due to a lack of resources to monitor life-science research and development, it raises serious questions about those states' capacities to adopt, promulgate, and enforce legislation across the often diverse and fluid national community of life scientists.[49]

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[43] US National Research Council, *Life Sciences and Related Fields*.
[44] US National Research Council, *Biotechnology Research in an Age of Terrorism* (Washington, DC: National Academies Press, 2004).
[45] Jeremy Littlewood, *Managing the Biological Weapons Problem: From the Individual to the International*, Weapons of Mass Destruction Commission, Paper No. 14, Stockholm: 2004; see also Harald Müller, Una Becker-Jakob, and Tabea Seidler-Diekmann, "Regime Conflict and Norm Dynamics: Nuclear, Biological, and Chemical Weapons," in Harald Müller, ed., *Norm Dynamics in Multilateral Arms Control* (Athens, GA: University of Georgia Press, 2013)
[46] BWC, Article X. See also Müller, Becker-Jakob, and Seidler-Diekmann, "Regime Conflict and Norm Dynamics," p. 62.
[47] Sims, *The Evolution of Biological Disarmament*, pp. 120–24.
[48] Germany on behalf of the European Union, "Assessment of National Implementation of the Biological and Toxin Weapons Convention," BWC/CONF.VI/WP.3, October 2006, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G06/646/41/PDF/G0664641.pdf?OpenElement>.
[49] United States of America, "National Implementation," BWC/MSP/2012/MX/WP.5 July 16, 2012.

Moreover, the temporal nature of the BWC, specifically the growing salience of bioterrorism, will potentially generate new issues related to capacity, with an expanding array of measures that several states have identified as requisite for preventing the development of biological weapons domestically. As Littlewood has noted, "the convention is the foundation of much activity at the frontline of biosafety and biosecurity."[50] However, despite various opportunities for assistance available to states parties, an implementation gap is likely to remain in part because of the limited capacity of many states.

… and Verification

The complexity of compliance has repercussions for efforts to build greater confidence in verification—the process of evaluating and determining compliance. Verification has been defined by Richard Lennane, former Head of the BWC Implementation Support Unit, as

> a structured and systematic means of:
>
> a. providing an increased level of assurance that States Parties are complying with the prohibitions and obligations of the Convention; and
> b. promptly, effectively and impartially investigating cases of alleged or apparent noncompliance with the prohibitions of the Convention.[51]

The primary function of a verification regime would be to detect noncompliance; however, as noted during the work of the Ad Hoc Group, "a verification regime aimed at detecting evasion that even performs only moderately well, is likely to have a significant deterrent effect on potential evaders."[52]

In this regard, it is worth revisiting at least one approach to verification that has been developed by Douglas MacEachin. Writing in 1998, MacEachin stated, "[a]bsent a regime for subjecting legitimate activities to a high degree of transparency, the best way for a violator to carry out a covert programme would be to bury it — piggy-back it—inside a legitimate programme."[53] In contrast, with "a regime for subjecting legitimate activities to a high degree of transparency," those seeking to violate the convention would be forced into the black, secret world where they are required to operate "under the strictest secrecy and vulnerable to leaks."[54] The dual-use characteristics of biotechnology therefore provides aspiring bioweaponeers with a potential civilian cover that, in the absence of a verification regime, can be used to

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[50] Littlewood, "The Art of Looking for Trouble."
[51] Lennane, "Verification for the BTWC."
[52] United Kingdom, "Verification of the BWC: Possible Directions," BWC/CONF.III/VEREX/WP.1, March 30, 1992, p. 2.
[53] Douglas J. MacEachin, "Routine and Challenge: Two Pillars of Verification," *CBW Conventions Bulletin*, No. 39 (1998), p. 1.
[54] Julian P. Robinson and Graham S. Pearson, "Maximizing Security Benefits from Technical Cooperation in Microbiology and Biotechnology: Infrastructure, Regulations and Procedures," in Malcolm R. Dando, Cyril Klement, Marian Negut, and G.S. Pearson, eds., *Maximizing the Security and Development Benefits from the Biological and Toxin Weapons Convention* (Springer Science & Business Media, 2012), p. 194.

mask prohibited activities. The would-be weaponeers need only to hide *the purpose* of any program, not the facilities, equipment, personnel, and materials.

As such, a secondary function of any BWC verification regime would therefore be to deter by weakening dual-use cover, forcing bioweaponeers to hide the purpose *and* the program. Hiding a substantial biological-weapons program is not likely to be easy. Even with considerable advances in the life sciences, any program seeking to develop reliable and predictable (as opposed to crude or "scruffy") BW with significant effect would likely require social commitments to function; specifically, it would need contracts, funders, brokers, and backers.[55] By removing the camouflage of peaceful purpose, cheaters would be forced to cease work, withdraw from the regime, or shift activities to conditions that are more anomalous, thereby potentially making things more visible.[56]

Accordingly, regardless of whatever semantic gymnastics or rebranding exercises are conjured up by the diplomatic community, BWC verification essentially entails the "collection, collation and analysis of information in order to make a judgment as to whether a party is complying with its obligations."[57] Although the specific means and methods employed would likely be very different to the model envisaged in the protocol discussions, it would nonetheless be based around three complementary processes: monitoring, assessment, and evaluation.[58]

Monitoring

First, verification requires the monitoring and collecting of relevant data pertaining to measures and activities that appear to either reinforce or undermine the BWC. In both the CWC verification system and the IAEA safeguards system, this is achieved through declarations, which form a "'baseline' of international monitoring" and, in the CWC context, theoretically form an "integral part of the regime of international monitoring, allowing the Secretariat to monitor the global movement of scheduled chemicals and to identify suspicious transfers or trends."[59] Moreover, declarations were a key component of the work of VEREX and the AHG and widely accepted in principle as a key part of any BWC verification architecture.[60] However, there was considerable disagreement on the scope of declarations, particularly in relation to topics such as biodefense.

In the case of the BWC, there are several indicators of national activities that reinforce the convention, including, inter alia, domestic legislation, oversight mechanisms, transparency in biodefense, or biosecurity measures. Examples of national activities that could undermine the prohibition include, inter alia, "suspicious transactions";

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[55] William Walker, "Entrapment in Large Technology Systems: Institutional Commitment and Power Relations," *Research Policy* 29, no. 7–8 (August 2000).
[56] MacEachin, "Routine and Challenge."
[57] United Nations Office for Disarmament Affairs, "Verification in All Its Aspects, Including the Role of the United Nations in the Field of Verification," Disarmament Study Series No. 32, (United Nations, 2008), p. 11.
[58] Julian Perry Robinson, "The Negotiations on Chemical-warfare Arms Control," *Arms Control* 1, No. 1 (1980), p. 40.
[59] Daniel Feakes, "Evaluating the CWC Verification System," *Disarmament Forum*, No. 4, (2002), p. 15.
[60] Littlewood, *The Biological Weapons Convention*, p. 67.

doctrine and training for BW; or the emergence of "secret, special and military facilities."[61] Notably, caution is needed in using indicators based exclusively on knowledge of past programs, if adequate available information on such programs exists. Future state BW programs may follow pathways to development similar to those of the past, but are more likely to have different footprints and exploit different technologies or facilities to different ends. The overt, state-level development of BW intended for massive casualties will generate particular footprints potentially identifiable by certain indicators. However, the same set of indicators may be less useful in detecting covert, small-scale BW development intended for sabotage or localized acts of terrorization. This is significant as the utility of BW cannot be decoupled from their intended purpose, which suggests consideration must be given as to which indicators are used to what end.

Given the broad definition of compliance outlined above, evaluation also requires gathering data on activities that reinforce or undermine other obligations of the BWC, such as those under Article X. Indicators of activities reinforcing international cooperation could include international exchanges of scientists, bilateral research programs, the twinning of facilities across borders, and examples of technology transfer. In contrast, indicators of activities that undermine international cooperation could include denials of export-control licenses or rejected visa applications.

Assessment

Suspicious transfers, controversial biodefense research, or export-license denials, on their own, are not necessarily indicative of noncompliance. Yet the collection and collation of such indicators allows states parties to develop a picture of another state's compliance. Piecing together this picture constitutes the second phase of a verification process and is achieved through technical assessment of the data collected in the monitoring process,[62] with a view to providing a "technical basis for answering a fundamentally political question."[63]

This process is augmented by two other key tools. The first is a mechanism for consultation and cooperation in "solving any problems which may arise in relation to the objective of, or in the application of the provisions of, the Convention," as laid out under Article V of the BWC. Mistaken or misplaced information does not necessarily correspond with a deliberate effort to cheat, and there may be reasonable explanations that account for a series of indicators that hint at noncompliance. Indeed, compliance issues are not necessarily "questions of good and evil," and accordingly, a flexible

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[61] Robert J. Mathews, "The Development of the Australia Group Export Control Lists of Biological Pathogens, Toxins and Dual-Use Equipment," *The CBW Conventions Bulletin*, No. 66 (2004); United Kingdom of Great Britain and Northern Ireland, "We need to talk about compliance: A response to BWC/MSP/2012/WP.11," BWC/MSP/2013/MX/WP.1, July 2013, <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G13/615/40/PDF/G1361540.pdf?OpenElement>.

[62] Robinson, "The Negotiations on Chemical-warfare Arms Control," p. 40.

[63] Ralf Trapp, *Verification under the Chemical Weapons Convention: On-Site Inspection in Chemical Industry Facilities*, SIPRI Chemical & Biological Warfare Studies no. 14 (Oxford: Oxford University Press, 1993), p. 5.

"safe space" is required to consult and clarify information submitted by – or pertaining to the compliance of – states.[64]

The second is some combination of visits and investigations. Both are required for an effective verification mechanism. Routine-type visits to facilities serve, among other things, to corroborate data submitted pertaining to a particular facility and incentivize states to make sure the information they submitted is accurate. Investigations would serve to determine "facts relating to a specific concern about possible noncompliance with the Convention."[65] Moreover, the threat of inspections could encourage states to declare all facilities and further discourage any efforts to stray from the stipulated activities taking place in any given location.[66]

Evaluation

The third step is an evaluation, based on the available data, of whether a country is in compliance.[67] Absent irrefutable evidence, the process of evaluation is subjective and political.[68] The nature of the evidence and how much of it is needed for states to reach, either collectively or individually, a political judgment of noncompliance is unlikely to be quantifiable; nor is the process of reaching a judgment something which can be achieved objectively and impartially.[69] It requires a system that generates enough relevant and reliable information to tip the balance between the costs and benefits of participation in the regime in its favor. In short, the threshold of required information is whatever is necessary to assure states parties that they remain better off inside—not outside—the regime.[70]

Strengthening the convention

Since there have been no withdrawals from the BWC and an increasing number of states joining it, it can be inferred that the benefits of being in the BWC regime, even without a verification mechanism, continue to outweigh the costs of being outside it.

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[64] Chayes and Chayes, "From Law Enforcement to Dispute Settlement."
[65] BWC, "Protocol to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction," BWC/AD HOC GROUP/CRP.8, April 3, 2001, p. 51.
[66] George Poste and Julian Perry Robinson, "The Biological Weapons Convention and its projected Protocol," in *Measures for Controlling the Threat from Biological Weapons* (London: The Royal Society, July 2000), <https://royalsociety.org/~/media/Royal_Society_Content/policy/publications/2000/10064.pdf>.
[67] Marie I. Chevrier, "Towards a Verification Protocol," in Malcolm Dando, Graham Pearson, and Tibor Tóth, eds., *Verification of the Biological and Toxin Weapons Convention* (Dordrecht: Kluwer Academic Publishers in cooperation with NATO Scientific Affairs Division, 2000), pp. 199–216.
[68] Chayes and Abram Chayes, "From Law Enforcement to Dispute Settlement;" Jeanett Voas, "The Arms-control Compliance Debate," *Survival* 28 (January 1986), pp. 8–31.
[69] Marie Isabelle Chevrier and Iris Hunger, "Confidence-building Measures for the BTWC: Performance and Potential," *Nonproliferation Review* 73 (September 2000), pp. 24–42.
[70] Paraphrased from Julian Perry Robinson, "Should NATO keep chemical weapons? A framework for considering policy alternatives," SPRU Occasional Paper No. 4, University of Sussex, Science Policy Research Unit, 1977.

Despite a small number of allegations of BW development,[71] the convention embodies a normative opprobrium on BW, with such weapons overwhelmingly eschewed by state (and non-state) actors, and the practice of biological warfare likely to be damned as the act of a pariah.[72] Paradoxically, the success of this norm has perhaps led to a drift in high-level policy attention to the convention as BW has declined as a priority national-security issue for many states parties, if indeed it ever was one. Nevertheless, as long as there is a need to both reaffirm the norms embodied in the BWC and to suppress activities that could potentially undermine them, a process of what US Ambassador Charles Flowerree described as "tending" the convention remains necessary, all the more so given the changes in science and security and the limited progress achieved at (and since) the Eighth Review Conference.[73]

There are several possible pathways to "tending" the convention. Many states have long insisted that the only sustainable method of strengthening the BWC is through a multilaterally negotiated, legally binding verification protocol.[74] Such a principled approach is perhaps understandable, and many individuals invested considerable personal and professional energy in the protocol negotiations. However, while a decade of work drawing on the collective wisdom of delegates in Geneva has produced a wealth of materials (some of which have continued utility), politically, the route of revisiting the protocol as a whole is effectively closed for the time being. Moreover, considerable effort would be required to reopen negotiations and update discussions for the twenty-first rather than the twentieth century.

Another alternative, proposed by the Russian Federation during the third intersessional process, was to strengthen the convention by returning to the 1994 mandate, but omitting work on verification and instead focusing on developing a legally binding instrument to address, inter alia, national implementation, cooperation, and a "mechanism for investigating alleged use of biological weapons."[75] They argued that such an approach could strengthen the BWC and improve implementation in many areas, as well as building institutional capacity. However, the proposal appears to have gained only limited traction thus far, with some states unenthused by the prospect of returning to negotiations and others reluctant to depart from the principled position of support for a verification protocol.

Furthermore, history would suggest that, rather than investing more time and energy to engineer a "paradigm shift" of returning to negotiations on a protocol, an incremental

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[71] See for example: U.S. Department of State. Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments, 2014. July 2014. <https://www.state.gov/documents/organization/230108.pdf>.

[72] Kai Ilchmann, and James Revill, "Chemical and Biological Weapons in the 'New Wars,'" *Science and Engineering Ethics* 20 (September 2014), pp. 753–67.

[73] Charles C. Flowerree, "On Tending Arms Control Agreements," *Washington Quarterly* 13 (1990), pp. 199–214.

[74] Graham S. Pearson, "The Biological Weapons Convention Seventh Review Conference: A Modest Outcome," HSP Reports from Geneva, 2011.

[75] Russian Federation, "Proposal by the Russian Federation for Inclusion in the Report of the Eighth Review Conference of the Biological Weapons Convention," 2001, <www.unog.ch/80256EDD006B8954/(httpAssets)/643DEBF9B1CA0334C1257E97003C3E00/$file/RussianWP.pdf>.

approach may be a more practicable and fruitful course of action, particularly if such an approach is "balanced" in how it serves the diverse interests of states parties.[76] Such a balanced, incremental approach could incorporate a series of modest, practical steps that generates benefits to all states parties.

Undertaking such steps is not a panacea for dealing with the challenges of BW, nor should states parties expect them to lead directly to a verification mechanism (or even resolve the Article X debate). However, small steps taken over time could lay the foundations for more informed concrete actions in the future and represent a preferable approach to leaving compliance to fragment and fester "until the emergence of an actual problem, a time that is not conducive to constructive dialogue on what compliance behavior may or may not be."[77]

Revisit the science and technology of compliance

More than a quarter of a century has passed since the initiation of VEREX. While the general conclusion—that certain combinations of measures could support the verification process—may still hold true, it would be remarkable if advances in science and technology had not affected the evaluation of the twenty-one potential verification measures identified (particularly those in the areas of "Information Monitoring" and "Remote Sensing") or created new opportunities for verification. Indeed, the VEREX group explicitly acknowledged the technological limitations of the time: "certain current scientific and technical shortcomings of some measures were appreciated," adding that "some technologies associated with particular measures are limited by the commercial availability of equipment, materials and stages of development."[78]

There have certainly been a number of technological developments in recent years, such as biosensors, satellite surveillance, and the embryonic field of bio-forensics which could considerably enhance measures falling under "Remote Sensing."[79] In addition, there are new sources of electronic information, such as the UN Comtrade Database—"a repository of official international trade statistics"—Google, Twitter, and YouTube, none of which were available in the 1990s, and which could supplement traditional approaches to data collection and technical assessment and enhance measures under the AHG category of "Information Monitoring."[80] There are also new practices and trends in the life sciences that have changed since VEREX, along with new methods of

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[76] Nicholas A. Sims and Jeremy Littlewood, "Ambitious Incrementalism: Enhancing BWC Implementation in the Absence of a Verification Protocol," *Nonproliferation Review* 18 (September 2011), pp. 499–511.
[77] Michael Moodie and Amy Sands, "New Approaches to Compliance with Arms Control and Nonproliferation Agreements," *Nonproliferation Review, 8, 1* (2001), pp. 1–9.
[78] BWC, "Report of the Ad Hoc Group of governmental experts to identify and examine potential verification measures from a scientific and technical standpoint," BWC/CONF.III/VEREX/9, September 24, 1993, p. 7.
[79] See for example the previous paper in this Occasional Paper series: Melissa Hanham, Catherine Dill, Jeffrey Lewis, Bo Kim, Dave Schmerler, Joseph Rodgers, "Geo4nonpro.org: A Geospatial Crowd-Sourcing Platform for WMD Verification," CNS Occasional Paper No. 28, <www.nonproliferation.org/op28-geo4nonpro-org-a-geospatial-crowd-sourcing-platform-for-wmd-verification/>.
[80] UN Comtrade Database, <https://comtrade.un.org>.

biological production, all of which are likely to have significant implications for efforts to evaluate BWC compliance. Finally, the historical record may also provide new knowledge derived from experiences with investigations in Iraq, and perhaps even Syria, that could provide "potential proliferation pointers from the past."[81]

The notion of a "VEREX 2.0" is likely to generate a number of political sensitivities—just as VEREX did two decades ago—and is not presently feasible.[82] However, a body mandated to examine and assess possibilities for developing and detecting BW as part of a wider process of reviewing science and technology of relevance to the convention is possible. Successive intersessional processes have touched upon topics of relevance to compliance, and at the Eighth Review Conference, the vast majority of states supported further work on science and technology (S&T) in principle, even if there was disagreement on, inter alia, the purpose, breadth of participation, and modalities of such a review process.

Agreement not just on the principles, but also the practicalities of an S&T review process would be a major achievement at the annual meeting scheduled for December 2017, regardless of whether this is achieved through a Science Advisory Committee as proposed by Russia or the more open and flexible working group proposed by others. S&T underpins many aspects of the convention, including compliance, but also cooperation and assistance,[83] with scientific and technological meetings providing one of the most important practical methods of exchanging information on technology for peaceful purposes. As such, the BWC requires "more frequent and focused" review of S&T developments, including identifying developments relevant to compliance.[84]

Collection and analysis of compliance indicators

Compliance begins at home. One simple step toward monitoring compliance would be the submission of information on the activities undertaken by states parties to be compliant with the BWC. To achieve this in the absence of declarations, some—regrettably not all—states parties have been submitting BWC CBMs since 1987, with submissions peaking in 2016 with a record eighty-two state submissions.[85] In their current form, the CBM forms cover a number of issues, including: information on national biodefense research, outbreaks of infectious disease, and national legislation, regulations, and other measures undertaken. More recently, information provided in these CBMs has been augmented by other BWC-specific materials, such as national

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[81] J.R. Walker, "Potential Proliferation Pointers from the Past, Lessons from the British Nuclear Weapons Program, 1952-69," *Nonproliferation Review* 19 (February 2012), pp. 109–23.
[82] Littlewood, *The Biological Weapons Convention*.
[83] Russian Federation, "Strengthening the Biological Weapons Convention Proposal for the Establishment of a Scientific Advisory Committee," BWC/CONF.VIII/PC/WP.2/Rev.1 Geneva, April 26, 2016.
[84] Statement by Andras Kos, Permanent Delegation of the European Union to the United Nations to the First Preparatory Committee for the Eighth Review Conference of the Biological and Toxin Weapons Convention (BTWC), Geneva, April 26, 2016, <https://eeas.europa.eu/sites/eeas/files/20160426_bwc_first_prepcom_2016_eu_statement_final_sp_final.pdf>.
[85] See "CBM Returns from 2000 onwards," United Nations Office at Geneva, n.d., <www.unog.ch/__80256ee600585943.nsf/(httpPages)/4fa4da37a55c7966c12575780055d9e8?OpenDocument&ExpandSection=17%2C18#_Section17>.

reports on domestic implementation and Article X-related activities; and documents developed for other bodies, such as the national reports submitted pursuant to UN Security Council Resolution 1540 (2004) and its follow-up resolutions.

CBMs and national reports are clearly not a substitute for verification, but such data nonetheless can partially fulfill a monitoring function. Indeed, as Lennane has indicated, "CBMs are in some sense already a kind of declaration regime."[86] However, there are problems both in terms of the quality and quantity of CBM submissions, and it remains unclear the extent to which CBMs are actually used by states parties for any form of assessment process.[87] As such, there is a need to improve the quantity and quality of CBMs, but also to make better use of such information, potentially through the "development of mechanisms that permit an assessment of implementation at the national level."[88]

Already some states have begun the process of inviting scrutiny of their domestic BWC implementation through peer-review exercises: "systematic examination[s] and assessment[s] of the performance of a State by other States, with the ultimate goal of helping the reviewed State improve its policy making, adopt best practices, and comply with established standards and principles."[89] Several states have undertaken such peer-review-type exercises, the German Peer Review process, for example, "was an assessment of all aspects of the [Bundeswehr Institute of Microbiology] facility that are relevant to provisions of the BTWC and provided on the CBM Form";[90] whereas the US "Implementation Review Initiative" sought, to inter alia, "… closely examine and document its implementation of the BWC … [and]… reassure other BWC States Parties of U.S. compliance with the BWC's implementation obligations."[91]

The wider use of such peer-review-type exercises could prove useful in assessing national implementation around the world, and, in the longer term, feed into an iterative process of determining reasonable expectations for what constitutes compliance under the convention and how this can be most effectively achieved. For example, through a combination of materials submitted under Resolution 1540,

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[86] Lennane, "Verification for the BTWC."
[87] See Norway, Switzerland, and New Zealand, "Confidence-Building Measures," BWC/CONF.VII/WP.21 <www.filippalentzos.com/wp-content/uploads/2014/10/BWC.CONF_.VII_.WP.21-copy.pdf>.
[88] Jez Littlewood, "The Verification Debate in the Biological and Toxin Weapons Convention in 2011," *Disarmament Forum,* Issue 3 (October, 2010), <www.unidir.org/files/publications/pdfs/arms-control-verification-en-320.pdf> pp. 15–27.
[89] Pagani, Fabricio. "Peer Review as a Tool for Co-Operation and Change: An Analysis of an OECD Working Method." African Security Review 11, No. 4 (2002).
[90] Germany Switzerland and the United Kingdom. "Confidence in Compliance - Peer Review Visit Exercise at the Bundeswehr Institute of Microbiology in Munich, Germany, 2016. BWC/CONF.VIII/WP.11, 21 October 2016, <www.unog.ch/80256EDD006B8954/(httpAssets)/1F158C667ABAAEBDC1258057004E5D1A/$file/BWCCONF.VIIIWP.11.pdf>.
[91] United States. BWC Implementation Review Initiative: Report by the United States of America on the Visit to Washington, DC, 2016. BWC/CONF.VIII/WP.18, 9 November 2016,<www.unog.ch/80256EDD006B8954/(httpAssets)/93BA88CE8BEF9C31C125806800368E8F/$file/BWCCONF.VIIIWP.18.pdf>.

intersessional discussions, national reports, and CBMs, there exists a body of data from which states parties could begin to identify expected "elements of legislative and administrative implementation" and build a matrix of key areas of national implementation, thereby removing some of the ambiguity of obligations under Article IV and potentially other aspects of the convention.

Develop the consultative mechanism

Article V of the BWC obliges states parties "to consult one another and to cooperate in solving any problems which may arise." Despite efforts during the First, Second, and Third Review Conferences to develop consultative procedures and processes, they remain underdeveloped and underutilized. Yet such a tool remains important, offering a potential means to clarify ambiguities, structure a process of consultation, and manage "the inevitable stream of disputes about interpretation and application" of the BWC.[92] Although formal, high-stakes accusations of BWC violations in the form of BW development remain unlikely (however possible), the complexity of compliance—its ambiguity and vulnerability to changing contexts and capacities—suggests such a consultative mechanism would more likely be applied to a trickle of comparatively minor disagreements over interpretations. With the protocol approach closed off, Article V provides one "useful avenue for enhancing compliance with the BWC."[93]

Accordingly, an important component of revisiting compliance is re-exploring the consultation and clarification provisions of the convention to draw out the "latent potential" of Article V and establish a flexible set of consultative measures, that allow "States Parties to select a method of consultation commensurate to the gravity of the problem identified."[94] This is an area with some support. Both the United States and the European Union have proposed further exploration of the consultative provisions, and a number of possible bilateral and multilateral options were identified over the course of the Eighth Review Conference.[95] These ranged from developing "procedures for private bilateral consultations," to "facilitated bilateral consultations," to multilateral peer-review exercises, to establishing a multilateral "Consultative Committee of Experts."[96]

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[92] Chayes and Chayes, "From Law Enforcement to Dispute Settlement."
[93] Jonathan B. Tucker, "Strengthening Consultative Mechanisms under Article V to Address BWC Compliance Concerns," Harvard Sussex Program Occasional Paper, No. 1, (2011), <http://unog.ch/80256EDD006B8954/(httpAssets)/944861B1DEE159F0C12578B90042B144/$file/TuckHSPOP_2.pdf>.
[94] European Union, "Enhancing the Effectiveness of the Consultative Provisions of Article V of the Biological and Toxin Weapons Convention," BWC/CONF.VIII/WP.16, (2016), <www.unog.ch/80256EDD006B8954/(httpAssets)/9CDF00BEC253B215C125805E004F963B/$file/BWC_CONF.VIII_WP.16.pdf>.
[95] See United States, "Strengthening Confidence-Building and Consultative Mechanisms under the Biological Weapons Convention," BWC/CONF.VIII/PC/WP.6, April 21, 2016, p. 3; and European Union, "Enhancing the Effectiveness of the Consultative Provisions of Article V of the Biological and Toxin Weapons Convention," BWC/CONF.VIII/WP.16, October 31, 2016, <www.unog.ch/80256EDD006B8954/(httpAssets)/9CDF00BEC253B215C125805E004F963B/$file/BWC_CONF.VIII_WP.16.pdf>.
[96] European Union, "Enhancing the Effectiveness of the Consultative Provisions of Article V of the Biological and Toxin Weapons Convention," BWC/CONF.VIII/WP.16, 2016,

Further exploration of such options—potentially including trial consultation or clarification exercises in which, for example, CBM ambiguities were publicly discussed—would be a useful step. Article V consultations can be applied to a range of issues under the BWC,[97] and in addition to generating greater confidence in compliance with the convention, the process might usefully serve to re-invigorate the BWC and desensitize discussions on compliance.

Building the provision of assistance in the event of a violation of the BWC

Under BWC Article VII, states parties undertake "to provide or support assistance… in the event of a violation of the Convention." The assistance provision has never been invoked and, in the absence of agreement around specific procedures (such as those devised during the AHG), there is likely to be a degree of uncertainty about the provision of support in the event of a violation. To overcome this uncertainty, the 2014 and 2015 BWC meetings generated useful discussions around Article VII, including the possibility of holding table-top exercises on the implementation of Article VII.[98]

Article VII was one of the few topics at the 2016 Review Conference where states advanced additional understandings, including the consensus agreement to establish a database to facilitate assistance under Article VII, a proposal put forth by France and India.[99] Populating this database will be an important task, as will be determining what BWC states parties could realistically offer in the event of an attack, beyond providing assistance through established public-health channels. It is equally important to develop procedures for invoking Article VII to avoid a situation of states "muddling through" at a time of acute crisis. This requires clarification on several issues, ranging from how assistance will be delivered and coordinated to the evidentiary requirements for the invocation of this article, to the direction of requests for assistance, to the harmonization of interaction with other communities of practice, to the format and content of requests for assistance.[100]

Dealing with the substantive and procedural issues pertaining to Article VII will require a significant and sustained effort that goes beyond the eighteen or so hours that were allotted during the last two years of the third intersessional process. Indeed, given the need for greater clarity—and the fact that Article VII was one of the few areas of

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<www.unog.ch/80256EDD006B8954/(httpAssets)/9CDF00BEC253B215C125805E004F963B/$file/BWC_CONF.VIII_WP.16.pdf>.

[97] Nicholas A. Sims, "BWC Article V: Under-Reviewed but Ripe for Exploration," Harvard Sussex Program Occasional Paper, No. 3, 2013, <www.sussex.ac.uk/Units/spru/hsp/occasional%20papers/HSPOP_3.pdf>.

[98] Jean-Pascal Zanders, Elisande Nexon, and Ralf Trapp, "Tabletop Exercise on the Implementation of Article VII of the Biological and Toxin Weapons Convention (BTWC) Report," Fondation pour la Recherche Stratégique, July 11, 2017, <www.frstrategie.org/publications/autres/2017/article-7-of-the-btwc/>.

[99] France and India, "Revised Proposal for Establishment of a Database for Assistance in the Framework of Article VII of the BWC," BWC/CONF/VIII/PC/WP.38/Rev.1, August 23, 2016; BWC, "Final Document of the Eighth Review Conference," BWC/CONF.VIII/4, January 11, 2017.

[100] Zanders, Nexon, and Trapp, "Tabletop Exercise on the Implementation of Article VII of the Biological and Toxin Weapons Convention (BTWC) Report."

convergence at the review conference—enhancing the provision of assistance under Article VII could be the basis of a working group, an idea proposed by the International Committee of the Red Cross in 2016.[101]

Explore Voluntary Visits

The various concepts identified under the rubric of "visits" (as opposed to investigations) in the AHG negotiations were recognized as serving a number of functions, including validating material submitted by states parties, encouraging transparency and accuracy of submissions, clarifying issues, providing an understanding of how biosecurity and biosafety operate in practice, building relations between institutions and international and local actors, and deterring noncompliance.[102] In addition, several states identified a cooperative function for visits. As a 1999 working paper by Brazil, Chile, New Zealand, and Norway stated:

> In addition to strengthening the compliance regime, the improvement of States Parties' capabilities through technical cooperation and assistance activities or programmes in the context of visits would be a cost-effective means for the Organization to simultaneously discharge some of its tasks under the various provisions of the Protocol.[103]

Visits can be considered an important part of any effort to strengthen the regime. Yet they are also potentially divisive and difficult: as the United Kingdom noted, there are "likely to be considerable problems over agreeing the parameters of such visits."[104] However, such problems are likely to be considerably more acute in the absence of any significant practical experience among BWC states parties with how visits would work, what can realistically be achieved in a visit, and what logistical challenges a visiting team may face.

As such, another step could be to further explore voluntary visits with a view to building a greater appreciation of what can realistically be expected of them, or to reach out to stakeholders for exchanging ideas on better practices. Several states have expressed support for exploring visits;[105] some have even undertaken visits as part of various BWC-related peer-review-type exercises. For example, Chile has employed visits in its BWC implementation review exercise, the Benelux peer-review process included two onsite visits, and Germany invited states parties to a "compliance visit in August 2016," adding that, while not a substitute for verification, visits and peer review "can serve as a useful tool until such verification may be achieved."[106] This practice is

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[101] "Biological weapons: Preparatory Committee for the Review Conference of States Parties," Statement by the International Committee of the Red Cross, August 9, 2016, <www.icrc.org/en/document/chemical-and-biological-weapons-statement-icrc>.
[102] Littlewood, *The Biological Weapons Convention*.
[103] Brazil, Chile, New Zealand, and Norway, "Proposed language for the section on randomly-selected visits and Annex B," BWC/AD HOC GROUP/WP.346, January 19, 1999, p. 1.
[104] United Kingdom of Great Britain and Northern Ireland, "We need to talk about compliance."
[105] Chile and Spain, "Voluntary visits for the BWC: a concept paper (unofficial translation in English)," BWC/CONF.VIII/PC/WP.28, 10- August, 2016.
[106] See Belgium, France, and the Netherlands, "Peer review: an innovative way to strengthen the BWC," BWC/CONF.VIII/PC/WP.13, May 4, 2016; see also Statement by H.E. Ambassador Michael Biontino to

likely to familiarize states with being scrutinized and can potentially provide a better understanding of the challenges and benefits of visits.

Enhancing the UN Secretary-General's Investigatory Mechanism

Twenty-first century conflicts are likely to be characterized by a congested and messy information space, with respective parties seeking to win "hearts and minds" through psychological operations. Allegations of association with biological weapons can be a powerful weapon in this regard, serving to "vilify enemies and to calumniate rivals."[107] As illustrated in the allegations and counter-allegations pertaining to chemical weapons use in Syria, misinformation, disinformation, and propaganda are likely to also be rife in the event of apparent BW use.

The changing speed and reach of these information warfare campaigns increases the value of independent assessments of allegations by a neutral body, such as the United Nations Secretary-General's Mechanism (UNSGM). The Organisation for the Prohibition of Chemical Weapons (OPCW) established a network of designated, accredited laboratories that can analyze samples, which has been successfully tried and tested over the course of the conflict in Syria. While the UNSGM maintains access to this network, there does not exist a similar network for investigating alleged BW use, leaving the BW capacity of the UNSGM comparatively underdeveloped and uncertain.[108] Enhancing the operational readiness of the UNSGM would therefore also feed into the compliance architecture.[109]

This requires, inter alia, a process of updating rosters of expertise and laboratory facilities; developing minimal standards for rostered laboratories; improving sampling practices; enhancing the chain of custody procedures; calibrating lab methods and reporting requirements, all with a view to ensuring any biological investigation is able to withstand considerable international scrutiny.[110] To this end, there is much that can be gleaned from the investigations in Syria, including those by the UNSGM, the OPCW, and the OPCW-UN Joint Investigative Mechanism.

Ideally, such a process would be undertaken multilaterally. However, in part because of the technical nature of discussions, and in part because of the stymying nature of political disagreement over the relevance of the UNSGM in the BWC context, the

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the First Preparatory Committee for the Eighth Review Conference of the Biological and Toxin Weapons Convention (BTWC), Geneva, April 26, 2016, <www.unog.ch/80256EDD006B8954/(httpAssets)/E4982AC9EB0B04EFC1257FA30033F23B/$file/BWC_PC_8RC_Germany.pdf>.

[107] Julian Perry Robinson, "Alleged Use of Chemical Weapons in Syria," Harvard Sussex Program Occasional Paper Number 4, 26 June, 2013, <www.sussex.ac.uk/Units/spru/hsp/occasionalpapers/HSPOP_4.pdf>.

[108] Spiez, "UNSGM Designated Laboratories Workshop Report" (2015), November 9–11, 2015, Spiez, Switzerland, <www.labor-spiez.ch/pdf/en/rue/UNSGM_Def_Report_2015.pdf>.

[109] United States, "Possibilities for Strengthening the International Community's Ability to Investigate Alleged Use," BWC/CONF.VIII/PC/WP.10, 26 April 2016, <www.unog.ch/80256EDD006B8954/(httpAssets)/ACD2EEBFC1B7EFA4C1257FA3004C4825/$file/BWC_CONF.VIII_PC_WP.10.pdf>.

[110] Personal notes from Third Spiez Workshop on Designated Laboratories of the UN Secretary-General's Mechanism. Hosted by Spiez Laboratory, 20–22 June 2017, Spiez Switzerland.

mechanism might be explored more constructively through a collective of likeminded or interested actors working outside the convention, with findings relayed to practitioners of disarmament diplomacy as progress is made.

Remedying the institutional deficit

The Secretariat of the International Atomic Energy Agency consists of a team of "over 2,500 professional and support staff" and OPCW staff numbers around 500, while the BWC's Implementation Support Unit (ISU) consists of three people (with some additional support through the European Union), a staffing level incommensurably lower, even considering the significant differences in their tasks.[111] If the 2017 meeting agrees to expand any BWC-related compliance activities—or indeed of any other activities of the BWC—a commensurate expansion of the ISU may be necessary. For example, the management and preliminary analysis of national reports will require some administrative support; science and technology reviews will require not insignificant organization, potentially also requiring ISU members' "taking on the role of rapporteur helping to capture and distill technical discussions."[112] The ISU would clearly need to play an administrative role in any multilateral exploration of visits or indeed any form of facilitated consultative mechanisms. As Germany stated, it will be important to "ensure that the ISU's mandate, resources, and staffing correspond appropriately to any decision we all might wish to agree upon for the intersessional period."[113]

In order to generate balance, any expansion of the ISU to undertake activities related to compliance (even broadly understood) will likely require a greater ISU role in international cooperation. The ISU is not "an operational agency in the field of international co-operation." Nevertheless, if states are serious about international cooperation and technology transfer, there could be considerable value in expanding the ISU to include a post with some form of cooperation mandate.[114] This could be as simple as actively working to identify relevant opportunities for cooperation and capacity building (through scholarships, e-learning, or funding). The details of such opportunities could then be collected, collated, and distributed to states parties on an episodic basis. While this would not resolve the Article X debate, it would generate prospects for more concrete Article X.

Inside or Out

There is clearly a great deal of work that needs to be done to understand—let alone begin to evaluate—BWC compliance, much of which is not feasible in the current

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[111] See International Atomic Energy Agency, "IAEA at a Glance - Atoms for Peace and Development," 2015, <www.iaea.org/sites/default/files/iaea_primer_2015.pdf>; Organisation for the Prohibition of Chemical Weapons, "About OPCW," 2016 <www.opcw.org/about-opcw/>.

[112] Switzerland, "Strengthening the BWC science and technology review process," BWC/CONF.VIII/PC/WP.8, April 25, 2016.

[113] Statement by H.E. Ambassador Michael Biontino to the First Preparatory Committee for the Eighth Review Conference of the Biological and Toxin Weapons Convention (BTWC), Geneva, April 26, 2016, <www.unog.ch/80256EDD006B8954/(httpAssets)/E4982AC9EB0B04EFC1257FA30033F23B/$file/BWC_PC_8RC_Germany.pdf>.

[114] Statement by Minister-Counsellor Titta Maja of Finland to the First Preparatory Committee for the Eighth Review Conference of the Biological and Toxin Weapons Convention (BTWC), Geneva, April 26, 2016.

political climate. Nonetheless, there are several things that could be explored to strengthen the convention at present. Ideally, such activities would be undertaken in the multilateral setting of the BWC. However, as Lennane has noted, "states parties have a poor record on collective action to implement and strengthen its provisions," and, as the Eighth Review Conference demonstrated, pursuing alternatives to a protocol is unlikely to be acceptable to some states. Given the controversy over making decisions outside the review conference process, expectations for the annual meeting in December 2017 should be treated with a healthy dose of realism.

Yet the Eighth Review Conference also showed that many states are keen to engage in concrete activities and are actively looking for "substantive decisions to move ourselves to action."[115] As such, perhaps there is a need to disaggregate those topics that can be dealt with inside the BWC from those that are initially best suited to exogenous activity. For example, the UNSGM is unlikely to be a fruitful topic of discussion in the BWC context, but has already been taken forward exogenously through various national and regional initiatives and could be developed further in the future. In contrast, the development of a consultative mechanism under Article V is perhaps an area where progress can be made within the BWC, building on past precedent, updating previously agreed procedures, and perhaps even trialing different approaches to undertaking consultations.

Some activities may require a hybrid approach. International scientific organizations such as the Inter Academy Panel, for example, have contributed significantly to reviewing S&T, and indeed, scientific experts working exogenously have much to contribute. However, there is a need for caution in such activities being outsourced entirely; first, because such a step could diminish the important voice of states in such a discussion, and, second, because some states remain concerned over nongovernmental scientists asserting too much influence over S&T reviews. As such, feeding external technical discussions on S&T of relevance to the BWC into a state-led S&T review process could be a useful way forward; the European Union has voiced its support for the idea through a 2016 Council Decision.[116]

This is not to suggest that states parties develop a parallel track for BWC-related activities. But in cases where there are differing levels of ambition or overwhelming political obstacles to progress, testing ideas or collecting and collating information through "collectives of the willing" (or of the curious) might provide a better understanding of aspects of compliance and how it can be demonstrated. Such an

[115] Closing remarks from Ambassador Raúl Heredia, Alternate Permanent Representative of Mexico to the UN, to the Eighth Review Conference of the Biological and Toxin Weapons Convention (BTWC), Geneva, November 25, 2016.
[116] European Union, Council Decision (CFSP) 2016/51 of 18 January 2016 in Support of the Biological and Toxin Weapons Convention (BTWC) in the Framework of the EU Strategy against Proliferation of Weapons of Mass Destruction. Official Journal of the European Union 19.1.2016, <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016D0051&from=LV>.

approach is not without precedent: several past initiatives have been pursued through untraditional routes to exploring new concepts with varying degrees of success.[117]

Conclusions

This paper argues that a process of sustained tending is required to maintain the relevance of the BWC and facilitate the convergence of expectations regarding compliance in a changing world. This may be easier said than done, since compliance is complicated. It requires taking into consideration both the positive and negative obligations of states parties to the convention, but it also requires attending to the inherent ambiguity of these obligations, their temporal nature, and the limited capacity of some states to carry them out.

There is thus a need to episodically revisit compliance to prevent the convention becoming outmoded in a changing scientific and security context, and to do so prior to an event, in circumstances that are relatively more conducive to constructive dialogue.[118] Although many states have maintained the principled position that this can only be achieved by returning to multilateral negotiations toward a legally binding verification protocol, this not feasible for the foreseeable future. Moreover, such a principled approach should not prevent states from further exploring the building blocks of compliance and looking at how processes of monitoring and assessing indicators of compliance and noncompliance could be updated for the twenty-first century.

Achieving consensus on how to update these components is unlikely in the short term. The political division evident at the Eighth Review Conference in 2016 suggest a substantive work agenda for the next intersessional period might prove difficult to agree on later this year. Such a disappointing result will not necessarily have an immediate effect on the norm against the biological weapons. However, the continued inability to revisit compliance and make substantive progress at a time of significant change in science and security risks leaving the compliance to fester and fragment. The 2017 Meeting of States Parties to the Convention held later this year offers an opportunity to rectify this trend, and bolster the prohibition of weapons deemed "repugnant to the conscience of mankind."

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[117] See, for example, S.J. Lundin, "*Verification of Dual-Use Chemicals under the Chemical Weapons Convention: The Case of Thiodiglycol*," SIPRI Chemical & Biological Warfare Studies (Stockholm/Oxford: SIPRI/Oxford University Press, 1991).

[118] Paraphrased from Moodie and Sands, "New Approaches to Compliance with Arms Control and Nonproliferation Agreements."

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